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EXAMINER	
MIDKIFF, ANASTASIA	
ART UNIT	**PAPER NUMBER**
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/507,200	SCHOMBERG, HERMANN	
	Examiner	Art Unit	
	Anastasia Midkiff	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the cone beam "wide enough to completely irradiate the x-ray detector in all possible orientations and positions" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an apparatus having an x-ray source emitting a cone beam wide enough to irradiate an entire x-ray detector does not reasonably provide enablement for an apparatus having an x-ray source emitting a cone beam which completely irradiates said x-ray detector *in all possible orientations and positions*. At most, the specification is only enabling for the range of detector orientations and positions permitted by the apparatus. Consequently, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 1, Lines 1-3, Claim 2, Lines 2-3, Claim 5, Lines 2-3, and Claim 10, Lines 4-6, the limitation "said beam being wide enough to completely irradiate the x-ray

detector in all possible orientations and positions" is indefinite insofar the limiting meaning of "all possible orientations and positions" is not understood.

Claims 3, 4, 6-9, and 11-20 are rejected based on their dependence upon Claims 1, 2, 5, and 10.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Caugant et al. (USP# 4,541,293) in view of U.S. Patent to Roos et al. (USP# 6,075,837).

With respect to Claims 1, 10, 11, and 15, Caugant et al. teach an x-ray apparatus, and method for its use, which includes:

- an X-ray source (124) for the emission of an X-ray beam wide enough to completely irradiate an x-ray detector (125; see Figure 2);
- an X-ray detector (125) for the multiple detection of X-rays after their passage through an object to be examined (Column 1 Lines 18-30), being arranged on an object axis (Figure 2), while the X-ray source and detector are displaced along a trajectory (Column 5, Lines 16-48);

- means (123) for changing the position of the X-ray detector relative to the X-ray source along an axis of alignment of the detector with the source (Column 3 Lines 31-34 and 57-60, Column 5 Lines 32-36, and Column 6 Lines 28-51) and with respect to source-detector distance (Column 6, Lines 48-62);
- a control unit (11) for displacing the X-ray source and the X-ray detector along the trajectory (Column 3 Lines 61-68, and Column 4 Lines 1-2) and for controlling rotationally on a central axis of said beam orientation of the X-ray detector during the detection of X-rays (Column 6, Lines 19-28).

Caugant et al. do not specifically teach that said source emits a conical beam, and that the detector is a flat, rectangular detector.

Roos et al. teach an x-ray apparatus wherein a cone-beam x-ray source (100, and Column 2 Lines 42-44) emitting a beam, said beam wide enough to completely irradiate a flat-panel digital detector (110) in all the possible orientations and positions of the detector (Figures 1 and 3-5), is used with varied beam geometries (Column 3, Lines 51-58) to obtain CT images of a patient (Column 1, Lines 66-67), said cone-beam and digital flat-panel receptors providing improved spatial resolution of images generated (Column 3, Lines 11-16), and being known to provide large-area, volume CT images quickly, with lower radiation dose to patient.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a cone-beam source and flat, rectangular detector in the apparatus and method of Caugant et al., to obtain volume CT images of high quality in an efficient

manner, with minimum time and discomfort to the patient, and to provide optimum viewing magnification, as suggested by Roos (Column 3, Lines 11-16).

With respect to Claim 2, Caugant et al. teach an x-ray apparatus, and method for its use, which includes:

- an X-ray source (124) for the emission of an X-ray beam wide enough to completely irradiate an x-ray detector (125; see Figure 2);
- an X-ray detector (125) for the multiple detection of X-rays after their passage through an object to be examined (Column 1 Lines 18-30), being arranged on an object axis (Figure 2), while the X-ray source and detector are displaced along a trajectory (Column 5, Lines 16-48);
- means (123) for changing the position of the X-ray detector relative to the X-ray source along an axis of alignment of the detector with the source (Column 3 Lines 31-34 and 57-60, Column 5 Lines 32-36, and Column 6 Lines 28-51) and with respect to source-detector distance (Column 6, Lines 48-62);
- a control unit (11) for displacing the X-ray source and the x-ray detector along the trajectory (Column 3 Lines 61-68, and Column 4 Lines 1-2) and for controlling the position and/or the orientation of the X-ray detector during the detection of X-rays (Column 6, Lines 11-33);
- wherein the detector is rotatable around the connecting line extending between the focal point of the X-ray source and the center of the X-ray detector (Column 6, Lines 19-28);

- the control unit for controlling the orientation of the X-ray detector being constructed in such a manner that one of the edges of the X-ray detector is always situated at right angles to the object axis while the trajectory is being completed (Column 6, Lines 43-47).

Caugant et al. do not specifically teach that said source emits a conical beam, and that the detector is a flat, rectangular detector.

Roos et al. teach an x-ray apparatus wherein a cone-beam x-ray source (100, and Column 2 Lines 42-44) emitting a beam, said beam wide enough to completely irradiate a flat-panel digital detector (110) in all possible orientations and positions (Figures 1 and 3-5), is used with varied beam geometries (Column 3, Lines 51-58) to obtain CT images of a patient (Column 1, Lines 66-67), said cone-beam and digital flat-panel receptors providing improved spatial resolution of images generated (Column 3, Lines 11-16), and being known to provide large-area, volume CT images quickly, with lower radiation dose to patient.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a cone-beam source and flat, rectangular detector in the apparatus and method of Caugant et al., to obtain volume CT images of high quality in an efficient manner, with minimum time and discomfort to the patient, and to provide optimum viewing magnification, as suggested by Roos (Column 3, Lines 11-16).

With respect to Claim 3, Caugant et al. further teach that control unit is arranged to adjust the orientation of the X-ray detector prior to the beginning of the completion of each trajectory in such a manner that one of the edges of the x-ray detector is situated

at right angles to the object axis (Column 6, Lines 43-62) and that the orientation of the X-ray detector is kept constant while the trajectory is being completed (Column 6, Lines 43-47).

With respect to Claim 4, Caugant et al. further teach that control unit is arranged to adjust the orientation in response to any change of the position of the X-ray source while a trajectory is being completed (Column 4, Lines 43-62).

With respect to Claims 5 and 8, Caugant et al. teach an x-ray apparatus, and method for its use, which includes:

- an X-ray source (124) for the emission of an X-ray beam wide enough to completely irradiate an x-ray detector (125; see Figure 2);
- an X-ray detector (125) for the multiple detection of X-rays after their passage through an object to be examined (Column 1 Lines 18-30), being arranged on an object axis (Figure 2), while the X-ray source and detector are displaced along a trajectory (Column 5, Lines 16-48);
- means (123) for changing the position of the X-ray detector relative to the X-ray source along an axis of alignment of the detector with the source (Column 3 Lines 31-34 and 57-60, Column 5 Lines 32-36, and Column 6 Lines 28-51) and with respect to source-detector distance (Column 6, Lines 48-62);
- a control unit (11) for displacing the X-ray source and the x-ray detector along the trajectory (Column 3 Lines 61-68, and Column 4 Lines 1-2) and

for controlling the position and/or the orientation of the X-ray detector during the detection of X-rays (Column 6, Lines 11-33);

- wherein the means for changing the position and/or orientation of the X-ray detector are constructed in such a manner that the angle between the central ray of the x-ray beam and the connecting line between the focal point of the source and the center of the detector can assume a value other than zero (Column 6, Lines 11-33); and,
- wherein the control unit is constructed in such a manner that at least two angular positions are adjusted during the detection of x-rays (Column 5 Lines 37-48, and Column 6 Lines 47-62).

Caugant et al. do not specifically teach that said source emits a conical beam, and that the detector is a flat, rectangular detector.

Roos et al. teach an x-ray apparatus wherein a cone-beam x-ray source (100, and Column 2 Lines 42-44) emitting a beam, said beam wide enough to completely irradiate a flat-panel digital detector (110) in all possible orientations and positions (Figures 1 and 3-5), is used with varied beam geometries (Column 3, Lines 51-58) to obtain CT images of a patient (Column 1, Lines 66-67), said cone-beam and digital flat-panel receptors providing improved spatial resolution of images generated (Column 3, Lines 11-16), and being known to provide large-area, volume CT images quickly, with lower radiation dose to patient.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a cone-beam source and flat, rectangular detector in the apparatus

and method of Caugant et al., to obtain volume CT images of high quality in an efficient manner, with minimum time and discomfort to the patient, and to provide optimum viewing magnification, as suggested by Roos (Column 3, Lines 11-16).

With respect to Claims 6 and 12, Caugant et al. further teach that the detector is arranged on one or more track rails (127, 156) in order to change its position and/or its orientation (Column 6, Lines 48-62).

With respect to Claim 7 and 13, Caugant et al. teach that the track rail (127) extends essentially perpendicularly to the central ray (Figure 2), notably a track rail which is curved around the focal point of the x-ray source (Figure 2).

With respect to Claim 9, Caugant et al. further teach that the control unit is arranged for the multiple displacement of the X-ray source along a trajectory during the irradiation of the object to be examined (Column 5, Lines 26-36) and for a different angular position of the X-ray detector during each completion of the same trajectory (Column 6, Lines 48-62).

With respect to Claim 14, Caugant et al. further teach a cylindrical examination zone (Column 6, Lines 28-33).

With respect to Claims 16-20, Caugant et al. further teach that detector is a flat, non-square detector (125, Figure 2) configured for rotation around the connecting line extending between the focal point of the x-ray source and the center of the detector (Column 6, Lines 19-28), the control unit for controlling orientation of the x-ray detector being constructed in such a manner that one of the edges of the X-ray detector is

always situated at right angles to the object axis (Column 6, Lines 43-62) while the trajectory is being completed (Column 6, Lines 43-47).

Response to Arguments

Applicant's arguments filed 19 April 2007 have been fully considered but they are not persuasive.

With respect to Caugant, the Applicant asserts that Caugant does not teach means for changing the position and/or the orientation of the x-ray detector *relative to* the x-ray source, because Caugant teaches displacing detector with respect to the patient, and because source and detector continue to face each other during rotation about a central point (See Applicant Remarks, Page 11, Paragraph 3). The examiner respectfully disagrees.

Caugant, at Column 6, Lines 48-56, teaches a means (156) for changing the position of the detector subassembly (125) relative to the x-ray source (124) for the purpose of adjusting the magnification. Consequently, Caugant teaches "means for changing the position and/or the orientation of the x-ray detector relative to the x-ray source."

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., that the source and detector do not face each other) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from

the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With respect to the combination of Caugant and Roos, the Applicant asserts that the references alone or in combination do not teach a conical beam wide enough to completely irradiate the x-ray detector in all possible orientations and positions, because Caugant does not teach a cone beam, and Roos does not teach a means for changing the position and/or orientation of the detector relative to the x-ray source (see Applicant Remarks, Page 12, Paragraph 1). The examiner respectfully disagrees.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In this case, Roos was not relied upon for means for changing the position and/or orientation of the detector relative to the x-ray source. Caugant teaches the detector with means for changing the position and/or orientation of the detector relative to the x-ray source, as mentioned above. Roos teaches the use of a cone beam and a flat panel detector in an x-ray imaging apparatus, wherein said cone beam is wide enough to completely irradiate the x-ray detector in all possible orientation and positions along the detector housing (112; see Figures 1 and 3-5), so that improved resolution and viewing may be achieved by larger magnification ratios (Column 3, Lines 11-16).

The examiner notes that flat panel detectors and cone beams are known for providing fast, high-quality images in x-ray imaging applications.

Consequently, Roos is considered to teach a conical beam "wide enough to completely irradiate the x-ray detector in all possible orientations and positions", and the combination is considered proper.

Therefore, the rejections of Claims 1-20 as cited above are maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. . The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASM
7/1/07

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